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EXAMINER	
CHEN, TSE W	

ART UNIT	PAPER NUMBER
2116	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/010,611	OHMORI ET AL.	
	Examiner	Art Unit	
	Tse Chen	2116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-13,15-19,21-25 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-13,15-19,21-25 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. It is hereby acknowledged that the following papers have been received and placed of record in the file: Amendment dated February 3, 2005.

2. Claims 1-6, 8-13, 15-19, 21-25, 27 are presented for examination. Applicant has canceled claims 7, 14, 20, 26.

Claim Objections

3. Claim 27 is objected to because of the following informalities: "... *Such* that said data signal slew rate is smaller..." should be "... *such* that said data signal slew rate is smaller..." Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure, US Patent 5305268, in view of Faunce, US Patent 5081646.

6. McClure discloses a data transfer system [abstract; communication between external data terminal and memory cells] comprising:

- A plurality of data lines for transferring data signals [input/output terminal dq 0-7] and at least one control line for transferring a control signal [write enable terminal w], said plurality of data lines and said at least one control line being allocated in parallel [fig.9, col.17, ll.41-55].

- A data driver [i/o circuitry 28] connected to at least one of said plurality of data lines [col.5, ll.3-18].
- A control driver [i/o circuitry 28] connected to at least one of said at least one control line [col.5, ll.3-18].
- A host system [external data terminal], coupled to send and receive said data signals and said control signal to and from at least one storage device [memory 1] [abstract, col.3, l.43 – col.4, l.45].

7. McClure did not discuss the slew rates of the data or control lines.

8. Faunce discloses a data transfer system [abstract] comprising:

- A plurality of data lines for transferring data signals [d0-7] and at least one control line for transferring a control signal [strobe], said plurality of data lines and said at least one control line being allocated in parallel [fig.2, col.1, ll.10-24].
- Setting a data signal slew rate and a control signal slew rate such that said data signal slew rate is smaller than said control signal slew rate [col.2, ll.16-30; low pass filtering of data lines makes slew of data lines smaller than strobe with is delayed to compensate], wherein a transition time of said data signal between a first reference data voltage and a second reference data voltage [e.g., low and high logic level] is longer than a transition time of said control signal between a first reference control voltage and a second reference control voltage [inherently, the transition time between voltage levels of the data signal would be longer than that of the control signal since the data slew rate is smaller than that of the control slew rate].

9. It would have been obvious to one of ordinary skill in the art, having the teachings of McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure to include the teachings of Faunce, in order to obtain the data transfer system comprising a host system, coupled to send and receive said data signals and said control signal to and from at least one storage device, setting a data signal slew rate and a control signal slew rate such that said data signal slew rate is smaller than said control signal slew rate. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to improve parallel communication over extended distances [Faunce: col.1, l.35 – col.2, l.8].

10. McClure and Faunce did not disclose explicitly that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds.

11. It would have been obvious to one of ordinary skill in the art, having the teachings of McClure and Faunce before him at the time the invention was made, to modify the teaching of setting the data signal slew rate and the control signal slew rate so that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds. Applicant did not disclosed an advantage, a particular purpose, or solution to a stated problem for specifically setting the data signal slew rate and the control signal slew rate so that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by

at least 2 nanoseconds. Therefore, one of ordinary skill in the art would have expected the claimed system to perform well with a wide range of transition-time-differences that falls within the broad range of "at least 2 nanoseconds" since Applicant did not disclose a related advantage, particular purpose, or solution to a stated problem that would have made the broad range of "at least 2 nanoseconds" non-obvious to one with ordinary skill in the art.

12. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure and Faunce as applied to claim1 above, and further in view of Kuroiwa, US Patent 6432731, and Zou et al., US Patent 6154101, hereinafter Zou.

13. McClure and Faunce disclose each and every limitation of the claim as discussed above in reference to claim 1. McClure and Faunce did not discuss setting the control driver to an optimum value of the control signal slew rate obtained from a table.

14. Kuroiwa discloses a data transfer system [fig.1] comprising a table [library] containing an optimum value of the control signal slew rate [slew rate Tmax], the optimum value dependent on a quantity of devices [loads] connected [col.6, l.53 – col.7, l.37; col.8, ll.10-17].

15. Zou discloses a data transfer system [fig.5] comprising a table containing a value of the control signal slew rate, wherein the host system [500] sets a value of the control signal slew rate in a control driver [PN generator] [col.3, l.64 – col.4, l.47].

16. It would have been obvious to one of ordinary skill in the art, having the teachings of Zou, Kuroiwa, McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure and Faunce to include the teachings of Zou and Kuroiwa, in order to obtain the data transfer system comprising a table containing an optimum value of said control signal slew rate, said optimum value dependent on a quantity of devices connected to said host

system, wherein said host system sets said optimum value of said control signal slew rate in said control driver upon said host system determining said quantity of devices. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to control the slew rate for optimal communication [Faunce: col.2, ll.16-21; slew rate may be increased despite low pass filtering to increase the data lines' maximum rate of change between voltage levels] [Kuroiwa: col.3, ll.21-61; determination of accurate slew rate based on quantity of devices is important].

17. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure and Faunce as applied to claim1 above, and further in view of Zou.

18. McClure and Faunce disclose each and every limitation of the claim as discussed above in reference to claim 1. McClure and Faunce did not discuss setting a rising slew rate independently of a falling slew rate.

19. Zou discloses a data transfer system [fig.5] wherein the host system sets a rising slew rate [advance] independently of a falling slew rate [retard] [col.4, ll.21-39; separate commands].

20. It would have been obvious to one of ordinary skill in the art, having the teachings of Zou, McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure and Faunce to include the teachings of Zou, in order to obtain the data transfer system wherein said host system sets a data signal rising slew rate independently of a data signal falling slew rate, and said host sets a control signal rising slew rate independently of a control signal falling slew rate. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to rapidly alter the slew rate [Zou: col.1, ll.6-10].

21. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure and Faunce as applied to claim1 above, and further in view of Sharpe, US Patent 6307441.

22. McClure and Faunce disclose each and every limitation of the claim as discussed above in reference to claim 1. McClure and Faunce did not disclose explicitly a clock signal.

23. Sharpe discloses a data transfer system [dds 150] wherein a control signal is a clock signal [tr data clk] [fig.4; col.6, ll.4-48; clock signals used to time operations].

24. It would have been obvious to one of ordinary skill in the art, having the teachings of Sharpe, McClure and Faunce before him at the time the invention was made, to use the clock control signal taught by Sharpe for the system disclosed by McClure and Faunce as the clock control signal taught by Sharpe is a well known control signal suitable for use with the data transfer system of McClure and Faunce. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to provide necessary timing for various system operations [Sharpe: col.6, ll.4-48; clock signals used for data acquisition].

25. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure and Faunce as applied to claim 1 above, and further in view of Nilsson et al., US Patent 6189052, hereinafter Nilsson.

26. In re claim 5, McClure and Faunce disclose each and every limitation of the claim as discussed above in reference to claim 1. McClure and Faunce did not discuss a particular specification.

27. Nilsson discloses a data transfer system [fig.1] wherein the data signals and the control signal [hstrobe] conform to AT Attachment (ATA) Specifications [col.4, l.35 – col.5, l.18].

28. It would have been obvious to one of ordinary skill in the art, having the teachings of Nilsson, McClure and Faunce before him at the time the invention was made, to use the ATA Specifications taught by Nilsson for the system disclosed by McClure and Faunce as the ATA Specifications taught by Nilsson is a well known specification suitable for use with the data transfer system of McClure and Faunce. One of ordinary skill in the art would have been motivated to make such a combination as it provides a standardized way to transfer data [Nilsson: col.4, ll.35-49].

29. As to claim 6, Nilsson discloses the data transfer system wherein the data signals and the control signal conform to ATA Packet Interface (ATAPI) Specifications [col.4, ll.35-55].

30. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure in view of Faunce and Pirzadeh, US Patent 6624964.

31. McClure discloses a data transfer method [abstract] for transferring, between a host system [external data terminal] and a storage device [memory 1], data signals via a plurality of data lines [input/output terminal dq 0-7] and a control signal via at least one control line [write enable terminal w], said plurality of data lines and said at least one control line being allocated in parallel [fig.9, col.17, ll.41-55], said method comprising the steps of:

- Generating via a plurality of drivers [i/o circuitry 28] the data signals having a data signal slew rate and the control signal having a control signal slew rate [col.5, ll.3-18; inherently, the signals generated will have a slew rate].
- Receiving said data signals and said control signal [col.17, ll.41-55].

32. McClure did not discuss the details of generating via the plurality of drivers the data signals slew rate being smaller than the control signal slew rate.

33. Regarding the data signals slew rate being smaller than the control signal slew rate, Faunce discloses a data transfer method [abstract] comprising:

- Setting a data signal slew rate smaller than a control signal slew rate [col.2, ll.16-30; low pass filtering of data lines makes slew of data lines smaller than strobe with is delayed to compensate].
- Receiving [at receiving device] the data signals [data lines] and the control signal [strobe], wherein a transition time of said data signal between a first reference data voltage and a second reference data voltage [e.g., low and high logic level] is longer than a transition time of said control signal between a first reference control voltage and a second reference control voltage [col.2, ll.16-30; inherently, the transition time between voltage levels of the data signal would be longer than that of the control signal since the data slew rate is smaller than that of the control slew rate].

34. It would have been obvious to one of ordinary skill in the art, having the teachings of McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure to include the teachings of Faunce, in order to obtain the data transfer method comprising setting a data signal slew rate smaller than a control signal slew rate. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to improve parallel communication over extended distances [Faunce: col.1, l.35 – col.2, l.8].

35. McClure and Faunce did not disclose explicitly that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds.

36. It would have been obvious to one of ordinary skill in the art, having the teachings of McClure and Faunce before him at the time the invention was made, to modify the teaching of setting the data signal slew rate and the control signal slew rate so that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds. Applicant did not disclosed an advantage, a particular purpose, or solution to a stated problem for specifically setting the data signal slew rate and the control signal slew rate so that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds. Therefore, one of ordinary skill in the art would have expected the claimed system to perform well with a wide range of transition-time-differences that falls within the broad range of "at least 2 nanoseconds" since Applicant did not disclose a related advantage, particular purpose, or solution to a stated problem that would have made the broad range of "at least 2 nanoseconds" non-obvious to one with ordinary skill in the art.

37. Regarding generating via a plurality of drivers the desired slew rates, Pirzadeh discloses a data transfer method [abstract] comprising:

- Generating via a driver [68] the signals [current I] having a signal slew rate [col.8, ll.6-30; col.12, l.65 – col.13, l.10; col.13, ll.22-36].

38. It would have been obvious to one of ordinary skill in the art, having the teachings of Pirzadeh and McClure before him at the time the invention was made, to modify the system taught by McClure to include the teachings of Pirzadeh, in order to obtain the data transfer

method comprising generating via a plurality of drivers the data signals having the data signal slew rate and the control signal having the control signal slew rate. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to minimize impact on data throughput [Pirzadeh: col.13, ll.22-36].

39. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure, Faunce and Pirzadeh as applied to claim 8 above, and further in view of Kuroiwa.

40. In re claim 9, McClure Faunce and Pirzadeh disclose each and every limitation of the claim as discussed above in reference to claim 8. McClure Faunce and Pirzadeh did not discuss determining a quantity of devices connected to the host system and setting an optimum value of the control signal slew rate obtained from a table.

41. Kuroiwa discloses a data transfer method [abstract] comprising the steps of:

- Determining a quantity of devices [loads] connected [col.6, l.53 – col.7, l.37].
- Setting an optimum value of the signal slew rates [slew rate Tmax] by referring to a table [library] correlating the quantity of the connected devices to the optimum values of the signal slew rates [col.8, ll.10-17].

42. It would have been obvious to one of ordinary skill in the art, having the teachings of Pirzadeh, Kuroiwa, McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure, Pirzadeh and Faunce to include the teachings of Kuroiwa, in order to obtain the data transfer method comprising the steps of determining a quantity of devices connected to a host system and setting an optimum value of said data signal slew rate and an optimum value of said control signal slew rate by referring to a table correlating said quantity of said connected devices to said optimum values of said data signal slew rates and said

control signal slew rates. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to control the slew rate for optimal communication [Faunce: col.2, ll.16-21; slew rate may be increased despite low pass filtering to increase the data lines' maximum rate of change between voltage levels] [Kuroiwa: col.3, ll.21-61; determination of accurate slew rate based on quantity of devices is important].

43. As to claim 10, Pirzadeh, McClure and Faunce disclose each and every limitation of the claim as discussed above in reference to claim 8. In particular, Pirzadeh discloses the data transfer method wherein a signal rising slew rate is set independently of a signal falling slew rate [fig.8c; col.13, ll.22-36; separate adjustments].

44. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure, Faunce and Pirzadeh as applied to claim 8 above, and further in view of Sharpe.

45. McClure, Faunce and Pirzadeh disclose each and every limitation of the claim as discussed above in reference to claim 8. McClure, Faunce and Pirzadeh did not disclose explicitly a clock signal.

46. Sharpe discloses a data transfer system [dds 150] wherein a control signal is a clock signal [tr data clk] [fig.4; col.6, ll.4-48; clock signals used to time operations].

47. It would have been obvious to one of ordinary skill in the art, having the teachings of Sharpe, McClure, Faunce and Pirzadeh before him at the time the invention was made, to use the clock control signal taught by Sharpe for the system disclosed by McClure, Faunce and Pirzadeh as the clock control signal taught by Sharpe is a well known control signal suitable for use with the data transfer system of McClure, Faunce and Pirzadeh. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to provide necessary

timing for various system operations [Sharpe: col.6, ll.4-48; clock signals used for data acquisition].

48. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure, Faunce and Pirzadeh as applied to claim 8 above, and further in view of Nilsson.

49. In re claim 12, McClure, Faunce and Pirzadeh disclose each and every limitation of the claim as discussed above in reference to claim 8. McClure, Faunce and Pirzadeh did not discuss a particular specification.

50. Nilsson discloses a data transfer system [fig.1] wherein the data signals and the control signal [hstrobe] conform to AT Attachment (ATA) Specifications [col.4, l.35 – col.5, l.18].

51. It would have been obvious to one of ordinary skill in the art, having the teachings of Nilsson, McClure, Faunce and Pirzadeh before him at the time the invention was made, to use the ATA Specifications taught by Nilsson for the system disclosed by McClure, Faunce and Pirzadeh as the ATA Specifications taught by Nilsson is a well known specification suitable for use with the data transfer system of McClure, Faunce and Pirzadeh. One of ordinary skill in the art would have been motivated to make such a combination as it provides a standardized way to transfer data [Nilsson: col.4, ll.35-49].

52. As to claim 13, Nilsson discloses the data transfer method wherein the data signals and the control signal conform to ATA Packet Interface (ATAPI) Specifications [col.4, ll.35-55].

53. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure in view of Faunce and Pirzadeh.

54. McClure discloses a storage device [memory 1] connected to a host system [external data terminal], said storage device comprising at least one driver in an interface section [i/o circuitry

28] of said storage device [col.5, ll.3-18; output to external data terminal], said at least one driver capable of transmitting to the host system multiple data signals via multiple data signal lines [input/output terminal dq 0-7] and at least one control signal via at least one control signal line [write enable terminal w], said multiple data signal lines and said at least one control signal line being allocated in parallel [fig.9, col.17, ll.41-55].

55. McClure did not discuss the details of sending via the driver with the data signals slew rate being smaller than the control signal slew rate.

56. Regarding the data signals slew rate being smaller than the control signal slew rate, Faunce discloses a data transfer method [abstract] comprising:

- Setting a data signal slew rate and a control signal slew rate such that said data signal slew rate is smaller than said control signal slew rate [col.2, ll.16-30; low pass filtering of data lines makes slew of data lines smaller than strobe with is delayed to compensate], wherein a transition time of said data signal between a first reference data voltage and a second reference data voltage [e.g., low and high logic level] is longer than a transition time of said control signal between a first reference control voltage and a second reference control voltage [inherently, the transition time between voltage levels of the data signal would be longer than that of the control signal since the data slew rate is smaller than that of the control slew rate].

57. It would have been obvious to one of ordinary skill in the art, having the teachings of McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure to include the teachings of Faunce, in order to obtain the data transfer system comprising a host system, coupled to send and receive said data signals and said control signal to

and from at least one storage device, setting a data signal slew rate and a control signal slew rate such that said data signal slew rate is smaller than said control signal slew rate. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to improve parallel communication over extended distances [Faunce: col.1, l.35 – col.2, l.8].

58. McClure and Faunce did not disclose explicitly that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds.

59. It would have been obvious to one of ordinary skill in the art, having the teachings of McClure and Faunce before him at the time the invention was made, to modify the teaching of setting the data signal slew rate and the control signal slew rate so that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds. Applicant did not disclosed an advantage, a particular purpose, or solution to a stated problem for specifically setting the data signal slew rate and the control signal slew rate so that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds. Therefore, one of ordinary skill in the art would have expected the claimed system to perform well with a wide range of transition-time-differences that falls within the broad range of "at least 2 nanoseconds" since Applicant did not disclose a related advantage,

particular purpose, or solution to a stated problem that would have made the broad range of "at least 2 nanoseconds" non-obvious to one with ordinary skill in the art.

60. Regarding sending via the driver the desired slew rates, Pirzadeh discloses a data transfer method [abstract] comprising:

- Sending via a driver [68] the signals having a variable signal slew rate [col.8, ll.6-30; col.12, l.65 – col.13, l.10; col.13, ll.22-36].

61. It would have been obvious to one of ordinary skill in the art, having the teachings of Pirzadeh and McClure before him at the time the invention was made, to modify the system taught by McClure to include the teachings of Pirzadeh, in order to obtain the storage device comprising the at least one driver capable of sending the data signals with a variable data signal slew rate and the at least one control signal with a variable control signal slew rate. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to minimize impact on data throughput [Pirzadeh: col.13, ll.22-36].

62. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure, Faunce and Pirzadeh as applied to claim 15 above, and further in view of Kuroiwa.

63. In re claim 16, McClure Faunce and Pirzadeh disclose each and every limitation of the claim as discussed above in reference to claim 15. In particular, McClure discloses the storage device wherein the storage device [memory 1] is one of at least one storage devices connected to the host system [at least one memory 1 connected to external data terminal] and Pirzadeh discloses the at least one driver [driver cell 102] transmits the signals at a slew rate value [col.1, l.66 – col.2, l.9; col.2, ll.32-42].

64. McClure Faunce and Pirzadeh did not discuss determining a quantity of devices connected to the host system and setting an optimum value of the control signal slew rate obtained from a table.

65. Kuroiwa discloses a data transfer system [fig.1] comprising a table [library] correlating the quantity of the connected devices [loads] to the optimum values of the signal slew rates [slew rate Tmax] [col.6, l.53 – col.7, l.37; col.8, ll.10-17].

66. It would have been obvious to one of ordinary skill in the art, having the teachings of Pirzadeh, Kuroiwa, McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure, Pirzadeh and Faunce to include the teachings of Kuroiwa, in order to obtain the storage device wherein said storage device, being one of at least one storage devices connected to the host system, further comprises a table correlating a quantity of said at least one storage devices to optimum values of said data signal slew rate and said control signal slew rate, and wherein said at least one driver transmits said multiple data signals and said at least one control signal at said optimum values. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to control the slew rate for optimal communication [Faunce: col.2, ll.16-21; slew rate may be increased despite low pass filtering to increase the data lines' maximum rate of change between voltage levels] [Kuroiwa: col.3, ll.21-61; determination of accurate slew rate based on quantity of devices is important].

67. As to claim 17, Pirzadeh, McClure and Faunce disclose each and every limitation of the claim as discussed above in reference to claim 15. In particular, Pirzadeh discloses the data transfer method wherein a signal rising slew rate is set independently of a signal falling slew rate [fig.8c; col.13, ll.22-36; separate adjustments].

68. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure, Faunce and Pirzadeh as applied to claim 8 above, and further in view of Nilsson.

69. In re claim 18, McClure, Faunce and Pirzadeh disclose each and every limitation of the claim as discussed above in reference to claim 15. McClure, Faunce and Pirzadeh did not discuss a particular specification.

70. Nilsson discloses a data transfer system [fig.1] wherein the control signal is a strobe signal [hstrobe] conforming to AT Attachment (ATA) Specifications [col.4, l.35 – col.5, l.18].

71. It would have been obvious to one of ordinary skill in the art, having the teachings of Nilsson, McClure, Faunce and Pirzadeh before him at the time the invention was made, to use the ATA Specifications taught by Nilsson for the system disclosed by McClure, Faunce and Pirzadeh as the ATA Specifications taught by Nilsson is a well known specification suitable for use with the storage device of McClure, Faunce and Pirzadeh. One of ordinary skill in the art would have been motivated to make such a combination as it provides a standardized way to transfer data [Nilsson: col.4, ll.35-49].

72. As to claim 19, Nilsson discloses the storage device wherein the control signal is a strobe signal [hstrobe] conforming to ATA Packet Interface (ATAPI) Specifications [col.4, ll.35-55].

73. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure in view of Faunce and Pirzadeh.

74. McClure discloses a computer system [abstract] comprising:

- A host system [external data terminal].
- A storage device [memory 1].

- At least one driver in said host system [inherently, a driver in the broadest interpretation is needed to drive data to memory] and at least one driver in said storage device [i/o circuitry 28], each said at least on driver in said host system and each said at least one driver in said storage device being capable of generating a data signal [input/output terminal dq 0-7] and a control signal [write enable terminal w] [col.5, ll.3-18; signals being generated both ways for input or output].

75. McClure did not discuss the details of generating via the driver the data signals slew rate being smaller than the control signal slew rate.

76. Regarding the data signals slew rate being smaller than the control signal slew rate, Faunce discloses a data transfer system [abstract] comprising:

- Setting a data signal slew rate and a control signal slew rate such that said data signal slew rate is smaller than said control signal slew rate [col.2, ll.16-30; low pass filtering of data lines makes slew of data lines smaller than strobe with is delayed to compensate], wherein a transition time of said data signal between a first reference data voltage and a second reference data voltage [e.g., low and high logic level] is longer than a transition time of said control signal between a first reference control voltage and a second reference control voltage [inherently, the transition time between voltage levels of the data signal would be longer than that of the control signal since the data slew rate is smaller than that of the control slew rate].

77. It would have been obvious to one of ordinary skill in the art, having the teachings of McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure to include the teachings of Faunce, in order to obtain the data transfer system

comprising a host system, coupled to send and receive said data signals and said control signal to and from at least one storage device, setting a data signal slew rate and a control signal slew rate such that said data signal slew rate is smaller than said control signal slew rate. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to improve parallel communication over extended distances [Faunce: col.1, l.35 – col.2, l.8].

78. McClure and Faunce did not disclose explicitly that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds.

79. It would have been obvious to one of ordinary skill in the art, having the teachings of McClure and Faunce before him at the time the invention was made, to modify the teaching of setting the data signal slew rate and the control signal slew rate so that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds. Applicant did not disclosed an advantage, a particular purpose, or solution to a stated problem for specifically setting the data signal slew rate and the control signal slew rate so that the transition time of the data signal between a first reference data voltage and a second reference data voltage is longer than a transition time of the control signal between a first reference control voltage and a second reference control voltage by at least 2 nanoseconds. Therefore, one of ordinary skill in the art would have expected the claimed system to perform well with a wide range of transition-time-differences that falls within the broad range of "at least 2 nanoseconds" since Applicant did not disclose a related advantage,

particular purpose, or solution to a stated problem that would have made the broad range of "at least 2 nanoseconds" non-obvious to one with ordinary skill in the art.

80. Regarding generating via the driver the desired slew rates, Pirzadeh discloses a data transfer system [abstract] comprising:

- Generating via a driver [68] the signals [current I] having a signal slew rate [col.8, ll.6-30; col.12, l.65 – col.13, l.10; col.13, ll.22-36].

81. It would have been obvious to one of ordinary skill in the art, having the teachings of Pirzadeh and McClure before him at the time the invention was made, to modify the system taught by McClure to include the teachings of Pirzadeh, in order to obtain the data transfer method comprising generating via a plurality of drivers the data signals having the data signal slew rate and the control signal having the control signal slew rate. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to minimize impact on data throughput [Pirzadeh: col.13, ll.22-36].

82. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure, Faunce and Pirzadeh as applied to claim 21 above, and further in view of Kuroiwa.

83. In re claim 22, McClure Faunce and Pirzadeh disclose each and every limitation of the claim as discussed above in reference to claim 21. In particular, McClure discloses the storage device wherein the storage device [memory 1] is one of at least one storage devices connected to the host system [at least one memory 1 connected to external data terminal] and Pirzadeh discloses the at least one driver [driver cell 102] transmits the signals at a slew rate value [col.1, l.66 – col.2, l.9; col.2, ll.32-42].

84. McClure Faunce and Pirzadeh did not discuss determining a quantity of devices connected to the host system and setting an optimum value of the control signal slew rate obtained from a table.

85. Kuroiwa discloses a data transfer system [fig.1] comprising a table [library] correlating the quantity of the connected devices [loads] to the optimum values of the signal slew rates [slew rate Tmax] [col.6, l.53 – col.7, l.37; col.8, ll.10-17].

86. It would have been obvious to one of ordinary skill in the art, having the teachings of Pirzadeh, Kuroiwa, McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure, Pirzadeh and Faunce to include the teachings of Kuroiwa, in order to obtain the storage device wherein said storage device, being one of at least one storage devices connected to the host system, further comprises a table correlating a quantity of said at least one storage devices to optimum values of said data signal slew rate and said control signal slew rate, and wherein said at least one driver transmits said multiple data signals and said at least one control signal at said optimum values. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to control the slew rate for optimal communication [Faunce: col.2, ll.16-21; slew rate may be increased despite low pass filtering to increase the data lines' maximum rate of change between voltage levels] [Kuroiwa: col.3, ll.21-61; determination of accurate slew rate based on quantity of devices is important].

87. As to claim 23, Pirzadeh, McClure and Faunce disclose each and every limitation of the claim as discussed above in reference to claim 21. In particular, Pirzadeh discloses the data transfer method wherein a signal rising slew rate is set independently of a signal falling slew rate [fig.8c; col.13, ll.22-36; separate adjustments].

88. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure, Faunce and Pirzadeh as applied to claim 21 above, and further in view of Nilsson.

89. In re claim 24, McClure, Faunce and Pirzadeh disclose each and every limitation of the claim as discussed above in reference to claim 15. McClure, Faunce and Pirzadeh did not discuss a particular specification.

90. Nilsson discloses a data transfer system [fig.1] wherein the control signal is a strobe signal [hstrobe] conforming to AT Attachment (ATA) Specifications [col.4, l.35 – col.5, l.18].

91. It would have been obvious to one of ordinary skill in the art, having the teachings of Nilsson, McClure, Faunce and Pirzadeh before him at the time the invention was made, to use the ATA Specifications taught by Nilsson for the system disclosed by McClure, Faunce and Pirzadeh as the ATA Specifications taught by Nilsson is a well known specification suitable for use with the storage device of McClure, Faunce and Pirzadeh. One of ordinary skill in the art would have been motivated to make such a combination as it provides a standardized way to transfer data [Nilsson: col.4, ll.35-49].

92. As to claim 25, Nilsson discloses the storage device wherein the control signal is a strobe signal [hstrobe] conforming to ATA Packet Interface (ATAPI) Specifications [col.4, ll.35-55].

93. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure and Faunce, as applied in claim 1 above, and further in view of Kuroiwa and Zou.

94. McClure discloses a data transfer system [abstract; communication between external data terminal and memory cells] comprising:

- A plurality of data lines for transferring data signals [input/output terminal dq 0-7] and at least one control line for transferring a control signal [write enable terminal w], said

plurality of data lines and said at least one control line being allocated in parallel [fig.9, col.17, ll.41-55].

- A data driver [i/o circuitry 28] connected to at least one of said plurality of data lines [col.5, ll.3-18].
- A control driver [i/o circuitry 28] connected to at least one of said at least one control line [col.5, ll.3-18].
- A host system [external data terminal], coupled to send and receive said data signals and said control signal to and from at least one storage device [memory 1] [abstract, col.3, l.43 – col.4, l.45].

95. Faunce discloses a data transfer system [abstract] comprising:

- A plurality of data lines for transferring data signals [d0-7] and at least one control line for transferring a control signal [strobe], said plurality of data lines and said at least one control line being allocated in parallel [fig.2, col.1, ll.10-24].
- Setting a data signal slew rate and a control signal slew rate such that said data signal slew rate is smaller than said control signal slew rate [col.2, ll.16-30; low pass filtering of data lines makes slew of data lines smaller than strobe with is delayed to compensate].

96. McClure and Faunce did not discuss setting the control driver to an optimum value of the control signal slew rate obtained from a table.

97. Kuroiwa discloses a data transfer system [fig.1] comprising a table [library] containing an optimum value of the control signal slew rate [slew rate Tmax], the optimum value dependent on a quantity of devices [loads] connected [col.6, l.53 – col.7, l.37; col.8, ll.10-17].

98. Zou discloses a data transfer system [fig.5] comprising a table containing a value of the control signal slew rate, wherein the host system [500] sets a value of the control signal slew rate in a control driver [PN generator] [col.3, l.64 – col.4, l.47].

99. It would have been obvious to one of ordinary skill in the art, having the teachings of Zou, Kuroiwa, McClure and Faunce before him at the time the invention was made, to modify the system taught by McClure and Faunce to include the teachings of Zou and Kuroiwa, in order to obtain the data transfer system comprising a table containing an optimum value of said control signal slew rate, said optimum value dependent on a quantity of devices connected to said host system, wherein said host system sets said optimum value of said control signal slew rate in said control driver upon said host system determining said quantity of devices. One of ordinary skill in the art would have been motivated to make such a combination as it provides a way to control the slew rate for optimal communication [Faunce: col.2, ll.16-21; slew rate may be increased despite low pass filtering to increase the data lines' maximum rate of change between voltage levels] [Kuroiwa: col.3, ll.21-61; determination of accurate slew rate based on quantity of devices is important].

Allowable Subject Matter

100. The indicated allowability of claims 7, 14, 20, and 26, is withdrawn in view of the new grounds of rejection.

Response to Arguments

101. All rejections of claim limitations as filed prior to Amendment dated February 3, 2005 not argued in entirety or substantively in response filed as said Amendment have been conceded by Applicant and the rejections are maintained from henceforth.

102. Applicant's arguments with respect to Zumkehr have been considered but are moot in view of the new ground(s) of rejection.

103. Applicant's arguments with respect to Kuroiwa have been fully considered but they are not persuasive. Applicant alleges that Kuroiwas "does not teach controlling slew rates based on a 'quantity of devices,' but rather on a quality (line capacitance and resistance) of a circuit". Firstly, Examiner asserts that the line capacitances and resistances of loads [devices, circuits] do represent a "quantity", or measure, under the broadest interpretation. Secondly, Applicant lacks indisputable support that line capacitances and resistances can ***only*** be associated with the quality attribute. Applicant further alleges that "'quantity and 'quality' in this context are not equivalent or even directly related, as is self-evident by the fact that a single device may have a capacitance/resistance that is higher than a total capacitance/resistance of numerous devices". Examiner notes that the feature upon which applicant relies (i.e., a single device having a capacitance/resistance that is higher than a total capacitance/resistance of numerous devices) is not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). As demonstrated, Applicant's arguments with respect to Kuroiwa are not persuasive and the rejections are respectfully maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tse Chen whose telephone number is (571) 272-3672. The examiner can normally be reached on Monday - Friday 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Browne can be reached on (571) 272-3670. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tse Chen
March 18, 2005

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